To: **Washington Citizens**

From: **Megan White, P.E., Manager**
Water Quality Program
Department of Ecology

Subject: **Proposed Language Addressing Regulation of Dams**
Decision Process for Ecology's Proposed Rule

This memorandum describes the decision-making process that resulted in the Washington Department of Ecology's (Ecology) proposal to propose changes to the special condition for the Columbia and Snake Rivers and to add language for compliance schedules for dams in the state's water quality standards.

Proposed Alternative

Ecology is proposing revised language to clarify the special condition for the Columbia and Snake Rivers for total dissolved gas. Ecology is also proposing to add a new sub-section to the implementation section of the rule, providing specific language on the compliance expectations of dams for meeting water quality standards and the use of a compliance schedule for that purpose.

Background

Ecology administers the state's surface water quality standards regulations (Chapter 173-201A WAC). These regulations establish minimum requirements for the quality of water that must be maintained in lakes, rivers, streams, and marine waters. This is done to ensure that all beneficial uses associated with these waterbodies are protected.

In the 1997 revisions to the water quality standards, a special condition was added to allow a higher level of total dissolved gas in the Columbia and Snake rivers in order to enable more fish passage over dams and thus protect more downstream migrating juvenile salmon and steelhead. Because insufficient information was available to determine the effects of the higher level gas on other aquatic species and because questions remained about the potential success of allowing more fish passage over dams, the special condition was written as temporary with a requirement that it be reviewed in 2003.

The allowance of compliance schedules for the re-certification of dams has risen in priority in the past year especially as more dams are going through the re-licensing process for the Federal Energy Regulatory Commission (FERC). A general compliance schedule provision already exists in the current rule at WAC 173-201A-160(4). While this section of the rule can be applied to dam re-licensing, it was felt that having explicit language to allow for compliance schedules for dams would be beneficial to Ecology, the regulated community, and the public.

Basis for Ecology's Proposal

The proposals for revisions to the special condition for the Snake and Columbia rivers and adding a new sub-section for compliance schedules for dams both originated at Ecology. More detailed explanations about the proposed revisions are given below.

Special Condition for the Snake and Columbia Rivers

The 1997 revision to allow the special condition for the Snake and Columbia rivers for total dissolved gas was based on a 1995 literature study that assessed the risks to downstream migrating juvenile salmon going through turbines versus the risks of gas bubble disease. The conclusion was that exposure to limited high gas levels through passing over the dams with increased spill and higher gasses generated by the plunging water was less harmful to these fish than passing through the turbines.

The 1997 water quality standards were revised accordingly to best protect salmonids. However, this adjustment in the standards was noted as temporary in order to allow time to assess actual impacts. The special condition also required continual biological monitoring to occur during the spill and juvenile out-migration in order to assess actual impacts to juvenile salmonids (a threshold based on percent bubbles in the fish's fins was set and if this threshold was exceeded, the spill would be curtailed).

The higher gas standard for the Columbia and Snake rivers has been used to successfully improve passage of juvenile salmon over the dams thus avoiding the direct and indirect dangers from going through the turbines. The biological monitoring performed on migrating juveniles at collection facilities at six dams inspected eye, fin, and lateral line for signs of gas bubble trauma, based on a ranking process looking at the percentage of area of the fish covered with bubbles.

Seven years of data have been collected and very low incidence of trauma has been observed. The years 1997 and 1999 represent almost record high and near normal runoff years. This table summarizes trauma found during those years:

Year	# of fish examined	Severe Gas Bubble Trauma signs	
		Number of fish	Percent of total fish
1997	42,751	117	0.27
1999	25,184	0	0

During these years, it is estimated that an increase of 4 to 6 percent in fish survival was gained by passing the fish over the dams in spill allowed to the adjusted 120 percent tailwater gas cap, as compared to spilling limited to the statewide total dissolved gas standard of 110 percent.

Ecology recognizes that these adjusted standards are protecting a highly important set of fish in the Pacific Northwest. These salmon primarily use the river as a migratory corridor to other waterbodies throughout the Columbia River Basin. It is Ecology's recommendation that the special condition be continued. Therefore, the water quality standards will continue to allow the spill cap to be 120 percent in the tailrace of each dam as measured as the highest 12-hour average

readings in any one day and to have a 125 percent cap as a one-hour measurement anywhere in the river.

This special condition for total dissolved gas will only apply to the Snake and Columbia rivers for fish spill. Consideration of applying this condition statewide would require further information to be collected in areas outside of the Columbia and Snake rivers. Ecology recognizes that long-term effects of dissolved gas on resident species is not fully known and would require more studies on depth and duration of these resident species in different habitats to better analyze potential impacts to these creatures. Until a study of this nature is completed, Ecology will not move forward with proposed changes to the statewide standard.

Compliance Schedules for Dams

Dam hydroelectric facilities, including those seeking FERC license renewals, are required to meet the water quality standards and can require a Clean Water Act 401 certification. Achieving standards in the near term may be very difficult and require significant investments of resources and time. Water quality program staff who work on the re-certification of these dams face significant challenges in writing conditions for a 401 certification that accomplishes the goal of meeting standards in a reasonable manner.

Ecology's consideration of this issue has resulted in identifying four major goals for re-certification of dams:

1. Dam owners should endeavor to meet water quality standards – facilities need to evaluate what it would take and implement those changes to the extent feasible.

2. The water quality standards should allow for off-ramps (such as site specific criteria or use attainability analyses) where the dam is not a cause of the water quality problem or no options short of dam removal will help.

3. If the facility changes based on the evaluation identified above are not feasible or do not achieve compliance with the standards, provide a path to establish site specific standards through a use attainability analysis that takes advantage of "less than full support" language in federal regulations (40 CFR 131.10(g)(4)).

4. If dam owners commit to a process to work through the items above, a 401 certification could be issued to comply with the standards.

Based on the above goals, language was then drafted in a new sub-section of the implementation section to allow compliance schedules for dams under the circumstances described in the standards. Ecology believes that this explicit language will provide assurances and clarity to the regulated community and the public on how dams are required to comply with the standards.

Accompanying Documents & Information

Draft language for the special condition for the Columbia and Snake rivers can be found in the proposed rule at WAC 173-201A-200(1)(f)(iv). Draft language for compliance schedules for dams can be found at WAC 173-201A-510(5).

A discussion of alternatives adding language for compliance schedules for dams can be found in the draft Environmental Impact Statement for the proposed rule on page 82.

Additional questions on the proposed revisions to address dams can be directed to Susan Braley in the Water Quality Program at (360) 407-6414.

Additional information on proposed revisions to the rule, including draft Administrative Procedures Act (APA) materials and the draft Implementation Plan, can be found by visiting our Web site at www.ecy.wa.gov/programs/wq/swqs.

Recommended Criteria

Proposed language for total dissolved gas:

(e) **Aquatic Life Total Dissolved Gas (TDG) Criteria.** TDG is measured in percent saturation. Table 200(1)(f) lists the maximum TDG criteria for each of the aquatic life use categories.

Table 200(1)(f) Aquatic Life Total Dissolved Gas Criteria in Fresh Water	
Category	**Percent Saturation**
Char	Total dissolved gas shall not exceed 110 percent of saturation at any point of sample collection.
Salmon, Steelhead, and Trout Spawning, and Rearing	Same as above.
Salmon, Steelhead and Trout Rearing Only	Same as above.
Non-Anadromous Interior Redband Trout	Same as above.
Indigenous Warm Water Species	Same as above.

(i) The water quality criteria herein established for TDG shall not apply when the stream flow exceeds the seven-day, ten-year frequency flood.
(ii) TDG is measured as an average of the twelve highest consecutive hourly readings in any one day, relative to atmospheric pressure.
(iii) The TDG criteria may be adjusted to aid fish passage over hydroelectric dams when consistent with a department-approved gas abatement plan. This plan must be accompanied by fisheries management and physical and biological monitoring plans. The elevated TDG levels are intended to allow increased fish passage without causing more harm to fish populations than caused by turbine fish passage.
(iv) The following special fish passage exemptions for the Snake and Columbia rivers apply when spilling water at dams is necessary to aid fish passage:

- TDG must not exceed an average of one hundred fifteen percent as measured in the forebays of the next downstream dams.
- TDG must not exceed an average of one hundred twenty percent as measured in the tailraces of each dam; and
- A maximum TDG one hour average of one hundred twenty-five percent must not be exceeded during spillage for fish passage.

Proposed language for compliance schedules for dams:

(5) **Compliance schedules for dams**:

(a) All existing dams in the State of Washington must comply with the provisions of this chapter.

(b) For dams that do not meet one or more of the state's water quality criteria, the dam owner must develop a water quality attainment plan that provides a detailed strategy for achieving compliance. The plan must include:

(i) A compliance schedule that does not exceed ten (10) years;

(ii) Identification of all reasonable and feasible improvements that could be used to meet standards, or if meeting the standards is not attainable, then to achieve the highest attainable level of improvement;

(iii) Any department-approved gas abatement plan as described in WAC 173-201A-200(1)(e)(ii) & (iii);

(iv) Analytical methods that will be used to evaluate all reasonable improvements;

(v) Water quality monitoring which will be used by the department to track the progress in achieving compliance with the state water quality standards; and

(vi) Benchmarks and reporting sufficient for the department to track the applicant's progress toward implementing the plan within the designated time period.

(c) The plan must ensure compliance with all applicable water quality criteria as well as any other requirements established by the department (such as through a Total Maximum Daily Load (TMDL) analysis).

(d) If the department is acting on an application for a water quality certification, the approved water quality attainment plan may be used by the department in its determination that there is reasonable assurance that water quality standards will be met by the dam.

(e) When evaluating compliance with the plan, the department will allow the use of models and engineering estimates to approximate design success in meeting the standards.

(f) If reasonable progress toward implementing the plan is not occurring in accordance with the designated time frame, the department may declare the project in violation of the water quality standards and the project's associated water quality certification.

(g) If an applicable water quality standard is not met by the end of the time provided in the attainment plan or after completion of all reasonable and feasible improvements, the owner must take the following steps:

(i) Evaluate any new reasonable and feasible technologies that have been developed (such as new operational or structural modifications) to achieve compliance with the standards and develop a new compliance schedule to evaluate and incorporate the new technology;

(ii) After this evaluation, if no new reasonable and feasible improvements have been identified, then prepare a Use Attainability Analysis as described in WAC 173.201A-440 or provide a scientific justification for site-specific criteria as

described in WAC 173-201A-430.

(g) New dams, and any modifications to existing facilities that do not comply with a gas abatement or other pollution control plan established to meet criteria in WAC 173-201A-200(1)(f), must comply with the water quality standards at the time of project completion.

(h) Structural changes made as a part of a department-approved gas abatement plan to aid fish passage, described in WAC 173-201A-200(1)(e)(ii) & (iii), may result in system performance limitations in meeting water quality criteria for that parameter at other times of the year.